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The GERRIDS of the Atlantic States (Subfamily Gerrinæ).

BY J. R. DE LA TORRE BUENO.

No entomologist, I suppose, who has collected in the free open spaces and wandered afield in quest of his trophies, has failed to see and notice, at one time or another, those strange long-legged insects that walk the waters as though they offered a solid surface to support them, and which we in this country call, "Water-striders." These insects, together with other and smaller forms make up the family *Gerridæ* in the great Heteropterous series, possibly one of the most remarkable aggregations of species known to the entomologist. Their haunts range from living springs, clear, secluded, shady and cool, to the vast expanses of the tropic ocean steaming under a torrid sun or lashed by wild storms into mighty waves. These last Gerrids are members of a most interesting tribe, the Halobatini, which occurs in all more or less extensive bodies of water, but never, to my knowledge, in currents of any kind. One of the oceanic forms visits our own Southern coasts and certain lacustrine species are common inhabitants of our ponds and lakes.

The family Gerridæ differs from all the other Heteroptera so far known from America, in having the claws sub-apical, that is, inserted in more or less of a cleft at some distance from the apex of the last tarsal segment. The heterogeneous assemblage of forms which ordinarily go under the name of "water-striders," may be differentiated by the following key, which presupposes some acquaintance in the field with the various species and genera.

KEY

to the families of the aquatic and semi-aquatic *Trochalopoda* (Gymnocerata), or Littoralia of the old authors.

1. (6.) Claws apical.
2. (3.) Head much produced in front of eyes, slender delicate insects, winged or wingless.................Family HYDROMETRIDÆ.

3. (2.) Head normal, not greatly produced beyond eyes.
4. (5.) Antennæ moderately long and slender, four-jointed, bugs of moderate size (about 5 mm.), winged or wingless, body generally green in color ....Family MESOVELIIDÆ.
5. (4.) Antennæ short and comparatively stout, 5-jointed, last joint fusiform, minute species (less than 3 mm.), winged or (rarely) wingless..............................Family NÆOGEIDÆ.
6. (1.) Claws subapical at least in one pair of feet. Family GERRIDÆ.
7. (10.) Posterior femora extending beyond the abdominal apex. Subfamily GERRINÆ.
8. (9.) Inner margin of the eyes convexly rounded; body comparatively short and broad, abdomen so short as to appear almost nymphal in some forms..........................Tribe *Halobatini*.
9. (8.) Inner margin of the eyes accurately sinuate behind the middle; body comparatively long and narrow, abdomen long. Tribe *Gerrini*.
10. (9.) Posterior femora not extending to the abdominal apex. Subfamily VELIINÆ.

In the tribe Gerrini, thus far only one genus has apparently been recorded east of the Mississippi and north of Georgia. This is the genus *Gerris*, consisting of three subgenera held by some authors to be genera. The characters of the tribe as given above will serve to distinguish the genus, and the following key will help to separate the subgenera:

Genus **GERRIS** Fabricius.

1. (6). Pronotum sericerous, dull, antennæ comparatively short and stout.
2. (5). First joint of the antennæ shorter than the second and third taken together.
3. (4). Antennæ as long as half the body; sixth abdominal segment in the ♂ roundly emarginate. Subgenus **Limnoporous** Stål.

(One species, *Gerris* (*Limnoporus*) *rufoscutellatus* Latreille.

4. (3). Antennæ not as long as half the entire length of the insect, not extending beyond the thorax; sixth abdominal segment in ♂ doubly emarginate. Subgenus **Gerris** s. str. (= *Limnotrechus* Stål).
5. (2). First joint of the antennæ longer than the second and third taken together. Subgenus **Aquarius** Schell. (= *Hygrotrechus* Stål).
6. (1). Pronotum glabrous, shining; antennæ long and slender. Subgenus **Limnogonus** Stål.

(Only one species of this genus, *Gerris* (*Limnogonus*) *hyalinus* Fabr. is recorded from the United States. It extends south from Florida throughout South America.)

Key to subgenus GERRIS S. str. (= *Limnotrechus* Stål).

1. (2.) Sixth abdominal segment acutely produced into a spine, comparatively slender species, is found mostly apterous. **canaliculatus** Say.
2. (1.) Sixth abdominal segment not spinously produced, stouter species, mostly winged.
3. (4.) Anterior margin of pronotum with a flavous line; second emargination of sixth ♂ segment roundly rectangular, ♀ genital segment comparatively broad; connexivum dark. **buenoi** Kirk.
4. (3). Anterior margin of the pronotum concolorous; second emargination of sixth ♂ segment narrow and rounded; ♀ genital segment comparatively narrow, connexivum flavus. **marginatus** Say.

Key to subgenus AQUARIUS Schell. (= *Hygrotrechus* Stål).

1. (2.) Comparatively stout species, generally apterous; legs short; underside of body dark; spines of sixth abdominal segment not reaching end of genital segment..............**remigis** Say.
2. (1.) Comparatively slender, generally winged; legs long; underside of body yellowish; spines of sixth segment reaching end of genital segment ....**conformis** Uhler.

Key to tribe *Halobatini*.

1. (6.) First antennal joint much shorter than the other three taken together; not much longer than the second and third taken together, and sometimes shorter.
2. (5,) Fourth (apical) joint longer than third.
3. (4.) Eyes larger, fairly prominent; colors black and yellow; lacustrine species. Genus **Trepobates** Uhler (= *Stephania* F. B. White).

(One species thus far recognized, of great distribution, *Trebobates pictus* H. S.)

4. (3.) Eyes small, widely separated; plumbeous forms, entirely sericeous; oceanic forms..............Genus **Halobates** Esch.

(Thus far, one species only appears to have been found on our coasts, *H. micans* Esch., which at times is found on the Florida beaches.)

5. (2.) Fourth (apical) joint never more than equal to third; basal joint of anterior tarsi much shorter than second; hind femora equal to or much shorter than hind tibia and tarsus taken together..........................Genus **Rheumatobates** Bergr.

6. (1). First antennal joint nearly equal to the remaining three taken together, much longer than second and third; antennæ almost as long as entire body; hind femora twice as long as hind tibia..........................Genus **Metrobatos** Uhler.

(The one species thus far ascribed to this genus is *M. hesperius* Uhler.)

Key to Genus RHEUMATOBATES Bergroth.

Males.

1. (2.) Hind femora and coxæ curiously swollen and distorted. **rileyi** Bergr.
2. (1.) Hind femora and coxæ simple................**tenuipes** Meinert.

Both Sexes.

1. (2). Mesosternum yellow, unicolorous......................**rileyi** Berg.
2. (1.) Mesosternum yellow with the anterior margin and the two posterior diverging bands brownish-black, these bands not reaching to the posterior margin and dilated near the anterior margin...**tenuipes** Meinert.

Gerris (*Aquarius*) **remigis** Say; 1832, Descr. Het. Hem., p. —; 1859, Compl. Writings, i, 362.

The tables for subgenera and species will make the determinatien of this form certain, but any doubt that might arise can be at once set at rest by means of Thomas Say's original description. This is perhaps the most common of our species and one of the most widespread too, at least so far as the area under discussion is concerned. It is to be found most frequently on running waters, although it also frequents still, but to a less extent. The winged form is very rare and is seldom seen in collections. They congregate in groups in shady, slow-moving parts of streams, at the tree roots projecting from banks into the water, in the shadow of bridges, and in general in almost any place where they have some shelter from the burning rays of the summer sun. They pass the winter as adults, hibernating under boards or logs or in other sheltered places near the waters they frequent. From the earliest days of spring, as soon as the ice is melted, they can be found in warm nooks and sheltered coves busily mating. The eggs are laid along the edges of grasses or other leaves growing under water but near the surface, to which they are fastened by a waterproof glue. They hatch out in about three weeks, according to the temperature, and after five molts reach the adult or perfect stage in some four weeks more. In the favorable conditions of heat, food and moisture ruling in an aquarium, the period of development is probably at a minimum. Their food consists of such insects as have the misfortune to fall into the water, on which they pounce and after rendering them unconscious by means of their narcotic saliva, they feast at their leisure. Both young and adults are parasitized by a bright red mite.

This species ranges from Labrador and British Columbia south into Mexico and east of the Rocky Mountains. Thus far it has been reported from the following States: Maine, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Maryland, Illinois, Michigan, Texas, Colorado, Arizona, Oregon, California, North Carolina, Georgia, Louisiana, etc. It seems to be very widespread, but we have no actual records other than those cited.

Gerris (*Aquarius*) **conformis** Uhler; 1878, Proc. Boston Soc. Nat. Hist., xix, p. 435.

The long produced abdominal processes of this form separate it sharply from its congener *G. remigis*, and the generic characters given in the tabe differentiate it from *G. rufoscutellatus* with which it might be mistaken. Further differences between it and *remigis* are the comparatively longer form, decidedly longer legs, more prominent eyes, etc. So far as my experience goes, it is distinctly an inhabitant of flowing waters, where its very long legs attract attention and make it recognizable even at a distance. In this latitude I have never seen it in the short-winged or wingless form, although I have specimens (brachypterous) from Louisiana. Apparently nothing is known of its life history, but it is carnivorous like the other Gerrids. Its range extends at least to Louisiana.

Gerris (*Gerris*) **marginatus** Say; 1832, op. c., p. — (Fitch reprint, p. 807); 1859, Compl. Writings, i, p. 362.

This small stout form is an abundant inhabitant of our lakes and ponds, where it preys on other insects. Like its larger cousin *remigis*, it hibernates as an adult, and begins to mate in early spring. The white cylindrical eggs hatch after some ten days or two weeks, the rapidity of the transformation depending on temperature and humidity. There are in this species also five nymphal instars, and the life cycle is in the neighborhood of five or six weeks. It ranges practically over the entire continent, from Canada into Mexico, where I have taken it.

Gerris (*G.*) **buenoi** Kirkaldy; 1911, Ent. News, vol. xxii, p. 246.

This species has been frequently confounded in collections with the preceding one. It is, however, much smaller, and very easily separated from *marginatus* by the genital structure and flavescent pronotal margin. It also frequents still waters, but is far more uncommon than the preceding. So far nothing seems to be known of its life-history, but doubtless it could be easily worked in aquaria. Its range, to my certain knowledge, is from British Columbia down to New Jersey.

Gerris (*G.*) **canaliculatus** Say; 1832, op. c., 807; 1859, op. c., 363.

This form, rather rare in the North becomes more abundant as we go South. It frequents still ponds, and even when at large its slim body and long antennæ distinguish it from its relatives *marginatus* and *buenoi.* The long antennæ also bring it near to the Central American species of the subgenus. Its chosen haunts are secluded little coves and bays in ponds, where it paddles quietly about seeking its prey. Owing to its scarcity it is not possible to say much definitely as to its hibernation or breeding habits. The ova, however, are similar to those of the other species of the genus, and the period of hatching and development vary but little from the others observed, The nymphal stages are five. In this species I was able to raise about thirty individuals from ova deposited in my aquaria, all the progeny of one *apterous* female, and *every one was macropterous.* This female was taken swollen with ova, which she deposited in my aquarium to the number of about thirty, which left her quite slim once more. She deposited three or four more similar batches, and although there was no male with her, *all* were fertile. This species is mainly Southern, and, as noted above, not very abundant about New York.

Gerris (*Limnoporus*) **rufoscutellatus** Latreille; 1807, Gen. Ins., iii, p. 134.

Excepting the oceanic forms, this is perhaps the most widely distributed of the *Gerrids*, and excepting the parasitic forms, one of most universal of the Heteroptera, saving perhaps *Nezara viridula*. It is a dweller in still waters of whose habits little is known beyond what is familiar of the other members of the genus, such as its carnivorous habits. Nothing is is known of its life-history, and unlike the other species, it is scarcely ever seen in the wingless form. About New York it is not uncommon, mainly in shallow marshy pools, but its life-history still remains to be worked out. This species extends throughout the holarctic region, from Western Europe to the Eastern United States. Its most Southern distribution in the East known to me, is North Carolina, and in the West is Colorado, the former record being from a specimen in the U. S. National Museum collection, and the other from the Colorado Agricultural Experiment Station at Ft. Collins.

Tribe HALOBATINI.

We now pass to the tribe *Halobatini* which presents a series of forms of a totally different facies. The general impression these species produce is of shortness and breadth of form as compared to the *Gerrini* which are long and narrow. In fact, Bianchi used this comparative ratio of the length and breadth to distinguish the two tribes (in his arrangement considered as subfamilies), but Bergroth employes the more scientic character of the outwardly curved inner margins of the eyes in the *Halobatini* in contradistinction to the partly excavate ones in the *Gerrini*.

Metrobates hesperius Uhler; 1871, Proc. Bost. Soc. Nat. Hist., xiv, p. 108.

This is a species which like most of the other members of the tribe, is lacustrine to a very great extent, and it may be seen congregated in large patches of blackness on the smooth waters of our lakes, or perhaps in the wide reaches of slow moving streams. It is a very active species, and skips and jumps in pursuit of its prey, or perhaps in playfulness. Very little is known about it beyond the fact that it extends from Canada at least as far south as South Carolina. It commonly occurs in the apterous, but the winged form seems not rare under favorable conditions. The nymph of this species together with that of *Rheumatobates* were described by Ashmead as *Halobatopsis béginii.*

Trepobates pictus H. S.; 1848 (?), Wanz. Ins., viii, p. 111, figs. 882, 883.

Here we have the most common and widespread species of the tribe, another dweller on the tranquil bosom of the lakes, where it skims solitary far from the shores or congregates in little shoals in some friendly sheltering cove, both young and old in one group. The winged form, very rare in this latitude, has a most peculiar (and to the collector, annoying) habit of breaking off its wings for about half their length, thus leaving several of the abdominal segments exposed, a trick which is not limited to one sex only. Judging from aquarium breedings, unlike the *Gerrini* known to me, the eggs are glued fast in masses embedded in a transparent glue, and in nature are probably attached to some solid object at the edge of the water. In due course the white eggs grow darker and hatch; the young nymph casts its skin five times before attaining its full growth in some five weeks or so. It ranges from Canada to Central America, in whose tropical climate the winged form is far more abundant than with us.

Rheumatobates rileyi Bergroth; 1892, Ins. Life, iv, p. 321.
Rh. tenuipes Meinert; 1895, Ent. Medd., p. 7.

In these two species we have two of the most peculiar of the water-striders. The female shows no striking peculiarities of structure, but the males in both (as well as in all the other species of the genus) have most peculiarly formed and distorted antennæ, which have all the appearance of being designed for prehensile organs. Thus far I have been unsuccessful in discovering their peculiar function, but should not be surprised if they had some connection with the mating habits of the insect and were employed in seizing the female antennæ during the act. *Rh. rileyi* also breaks off its wings, and in this form there is a well defined line of weakness across the hemelytra. In this species the middle legs in the male are most peculiarly distorted, this furnishing the most reliable character by which to separate it from *tenuipes*, in which they are straight and simple. Being rather shy and inconspicuous, and looking much like the nymphal stages of some larger form, they have not been much collected, so *Rh. tenuipes* has thus far been recorded only from the District of Columbia, together with *rileyi* which, however, is also known from New York and New Jersey. Nymphs from Quebec Prov., Canada, were included in his types of *Halobatopsis béginii* by Ashmead. The known distribution of these two species is too limited to be real, and doubtless careful collecting will add them to other faunas. And here I would like to give to my late esteemed friend the Rev. J. L. Zabriskie the credit that is his due for his most interesting discovery and first description, unfortunately without a name, of the form known later as *Rh. rileyi*, named by Dr. E. Bergroth, who recognized its novelty, after the great American entomologist who referred it to him for study. This is a very fair example of the reasons on which I base my distaste for naming species after individuals. Is there not also a *Gerris* named after me by a dear friend? Yet all my share in this was to send him for study some specimens received under another label from my other good friend, E. P. Van Duzee, whose, after all, is the real credit for having recognized it as new.

Returning now "to our muttons," we come to that fascinating group which contains

Halobates micans Esch.; 1823, Nat. Ah. Dorp., i, p. 163 (=*wüllerstorffi* Frauenfeld; 1867, Verh. zool.-bot. Ges. Wien., xvii, p. 458; F. B. White, 1883, Rep. Chall. Exp., Zool., pl. 1, f. 2. [all the other descriptions are also to be found in this work]).

This form is included, because although not as yet recorded from the North Atlantic Ocean, it is not uncommon on the

Florida beaches, cast there by stormy wind and wave, and may some summer day be found on our own coasts. This, the type genus of the tribe, is a purely oceanic form, and has been taken hundreds of miles from the nearest land, but it also has been found among the Florida keys. Females have been found with the extruded eggs attached to the abdomen, and the Vitor Pisani expedition picked up a floating feather on which were some red eggs, which judging from an examination of the embryo, were ova of Halobates. How they brave the oceanic tempests, how they breed, what they eat, are all mysteries befogged by speculation. This tiny being contributes to biology one of those problems which form its fascination for those who love that science.

I have set forth in the preceding pages, very briefly, perhaps *too* briefly, an outline of what is known regarding these most remarkable forms, in the hope that by enabling others to recognize them, our knowledge of their habits, their life-histories and their distribution may be greatly enlarged.